

Notice of Allowability

Application No.

10/757,276

Examiner

Stephen W. Smoot

Applicant(s)

BEAMAN ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to applicant's RCE filed on 18 September 2007.
2. ☒ The allowed claim(s) is/are 36-41, 43-45, 49-66 and 68-70.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date 9-18-07
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

Stephen W. Smoot

Stephen W. Smoot
Primary Examiner
Art Unit 2813

DETAILED ACTION

This Office action is in response to applicant's RCE filed on 18 September 2007.

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after allowance or after an Office action under *Ex Parte Quayle*, 25 USPQ 74, 453 O.G. 213 (Comm'r Pat. 1935). Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's IDS filed on 18 September 2007 has been considered.

Allowable Subject Matter

2. Claims 36-41, 43-45, 49-66, 68-70 are allowed.
3. The following is an examiner's statement of reasons for allowance:

- Claims 36-41, 56-58 are allowed because the prior art of record does not teach or suggest, in combination with the other claim limitations, a method of forming a structure over a semiconductor substrate that includes the step of exposing a silicon dioxide containing layer to an activated nitrogen species formed from plasma conditions to provide nitrogen within the silicon dioxide containing layer; wherein substantially all nitrogen within the silicon dioxide containing layer is spaced from the substrate, combined with the subsequent step of forming a first conductively doped silicon-containing layer physically against the silicon dioxide containing layer, and further combined with the step of forming a second conductively doped silicon-containing layer over the first conductively doped silicon-containing layer, wherein the first and second silicon-containing layers comprise different conductivity types;
- Claims 43-45, 59-61, 66, 68, 70 are allowed because the prior art of record does not teach or suggest, in combination with the other claim limitations, a method of forming a structure over a semiconductor substrate that includes the step of exposing a silicon dioxide containing layer to nitrogen ions to provide nitrogen within only an upper portion of the silicon dioxide containing layer, combined with the subsequent steps of forming conductively doped amorphous silicon physically against the upper portion of the silicon dioxide containing layer and oxidizing the conductively doped amorphous silicon
- Claims 49-55, 62-65 are allowed because the prior art of record does not teach or suggest, in combination with the other claim limitations, a method of forming a

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- structure over a semiconductor substrate that includes the steps of exposing a silicon dioxide containing layer to nitrogen atoms comprising a higher energy state than their ground state to provide nitrogen primarily within an upper surface of the silicon dioxide containing layer, wherein the silicon dioxide containing layer is formed physically against a first region of the substrate, and forming conductively doped silicon physically against the upper surface of the silicon dioxide containing layer, combined with the subsequent step of oxidizing the conductively doped silicon and an exposed second region of the substrate; and
- Claim 69 is allowed because the prior art of record does not teach or suggest, in combination with the other claim limitations, a method of forming a structure over a semiconductor substrate that includes the step of exposing a silicon dioxide containing layer to nitrogen ions to provide nitrogen within only an upper portion of the silicon dioxide containing layer, combined with the subsequent step of forming conductively doped amorphous silicon physically against the upper portion of the silicon dioxide containing layer, and further combined with the step of forming conductive material over the conductively doped amorphous silicon, wherein the conductive material includes a conductivity type that is different from a conductivity type of the conductively doped amorphous silicon.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen W. Smoot whose telephone number is 571-272-1698. The examiner can normally be reached on Monday to Friday from 8:00am to 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.